

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of Robert A. Holton

Art Unit 1625

Serial No. 09/063,477

Filed April 20, 1998

Confirmation No. 4505

For PROCESS FOR SELECTIVE DERIVATIZATION OF TAXANES

Examiner Rita J. Desai

**BRIEF FOR APPELLANTS**

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Examiner Rita J. Desai

February 21, 2007

**BRIEF FOR APPELLANTS**

This is an appeal from the final rejection of the claims of the above-referenced application made in the Office action dated August 21, 2006. A Notice of Appeal was filed on November 21, 2006.

The appeal brief fee in the amount of \$500.00 and an extension fee in the amount of \$120.00 is submitted herewith.

**I. REAL PARTY IN INTEREST**

The real parties in interest are Florida State University and its exclusive licensee, MDS Research Foundation, Inc., and its exclusive sublicensee, Taxolog Inc.

**II. RELATED APPEALS AND INTERFERENCES**

Appellants are unaware of any pending appeals or interferences which may directly affect or be directly affected by, or have a bearing on, the Board's decision in the pending appeal.

**III. STATUS OF CLAIMS**

Claims 1 and 3-23 are pending in this application. Claim 2 was canceled. The claims on appeal are set forth in full in Appendix IX.

Claims 1 and 3-23 stand rejected under 35 U.S. C. § 112 for failing to comply with the written description requirement. The rejection of each of the rejected claims is being appealed.

**IV. STATUS OF AMENDMENTS**

No Amendments were filed subsequent to the final rejection.

**V. SUMMARY OF CLAIMED SUBJECT MATTER**

Prior to the process described in appellants' specification, strategies for the preparation of taxol, a potent chemotherapy drug, and other taxanes were based upon the observation of Senilh et al. (C.R. Acad. Sci. Paris, IT, 1981, 293, 501) that the relative reactivity of the four hydroxyl groups of 10-deacetylbaccatin III ("10-DAB") toward acetic anhydride in pyridine is C(7)--OH>C(10)--OH>C(13)--OH>C(1)--OH. Denis, et. al. reported (J. Am. Chem. Soc., 1988, 110, 5917) selective silylation of the C(7) hydroxyl group of 10-DAB with triethylsilyl chloride in pyridine to give 7-triethylsilyl-10-deacetyl baccatin (III) (2) in 85% yield. Based upon these reports, in those processes in which differentiation of the C(7) and C(10) hydroxyl groups is required (e.g., preparation of taxol from 10-DAB), it was believed that the C(7) hydroxyl group must be protected (or derivatized) before the C(10) hydroxyl group is protected or derivatized. For example, taxol may be prepared by treating 10-DAB with triethylsilyl chloride to protect the C(7) hydroxyl group, acetylating the C(10) hydroxyl group, attaching the side chain by esterification of the C(13) hydroxyl group, and, finally, removal of protecting groups.<sup>1</sup>

Prior to the process described in appellants' specification, it was also known that taxanes having various substituents bonded to either the C(10) or the C(7) oxygens show anticancer activity. To provide for more efficient synthesis of these materials, it was desirable to have methods which permit more efficient and more highly selective protection or derivatization of the C(10) and the C(7) hydroxyl groups.<sup>2</sup>

Claim 1 is the sole independent claim. It is directed to a process for the *selective* acylation of the C(10) hydroxy group of a taxane having C(7) and C(10) hydroxy groups. Stated differently, the process of claim 1 enables the reactivities reported above for the C(7) and C(10) positions to be reversed; that is, the reactivity of the C(10) hydroxyl

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<sup>1</sup> Appellants' specification at page 1, line 24 - page 2, line 19.

<sup>2</sup> Appellants' specification at page 2, lines 20-26.

group becomes greater than the reactivity of the C(7) hydroxyl group.<sup>3</sup> The process comprises treating the taxane with an acylating agent in a reaction mixture containing a Lewis acid and less than one equivalent of an amine base for each equivalent of taxane.<sup>4</sup>

## VI. ISSUES TO BE REVIEWED ON APPEAL

The only issue to be reviewed is whether the rejected claims comply with the written description requirement of 35 U.S.C. 112, first paragraph.

## VII. ARGUMENT

The rejected claims do not stand or fall together. For purposes of appeal, they have been separated into three groups: claims 1, 6, 7, 9, 13-19, 22 and 23 (Group I), claims 3, 8, and 10 (Group II), and claims 4, 5, 11, 12, 20 and 21 (Group III). They are separately patentable for the reasons presented below.

### A. The Group I Claims (claims 1, 6, 7, 9, 13-19, 22 and 23)

Claim 1 is representative of the Group I claims. For ease of discussion, it is reproduced in its entirety:

1. A process for the acylation of a C(10) hydroxy group of a taxane having C(7) and C(10) hydroxy groups, the process comprising treating the taxane with an acylating agent in a reaction mixture containing a Lewis acid and less than one equivalent of an amine base for each equivalent of taxane to selectively acylate the C(10) hydroxy group.

The Office rejected claim 1 because

Appellants' claims are drawn to a process of making taxane derivatives wherein the X2, X3, X4-14 and Z9 have hydrocarbyl, substituted hydrocarbyl, hetero aryl groups as substitutions. The specification on pages 6 and 7 have the recitation of the hydrocarbyl and heteroaryl. There is no definition to these groups. **The specification gives no guidance to one of ordinary skill in the art which groups are encompassed by this definition.** The next one is protective group. The

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<sup>3</sup> Appellants' specification at page 4, lines 20-28.

<sup>4</sup> The process is generically described, for example, at page 3, lines 3-10 and page 6, lines 18-29 (use of less than one equivalent of an amine base) and at page 7, line 26 - page 8, line 3 (use of a Lewis acid in the reaction mixture).

specification again does not define the groups in this category. The generic groups includes plethora of compounds, which has this functional moieties."<sup>5</sup>

The Office's rejection misses the mark for several reasons. The terms hydrocarbyl, substituted hydrocarbyl, heteroaryl, and protective group do not appear in claim 1 (or any of the other Group I claims). They are also defined in the specification: the definition of hydrocarbyl can be found at page 35, the definition of substituted hydrocarbyl can be found at pages 36-37, the definition of heteroaryl can be found at page 36 and the definition of protective group can be found at pages 34-35. Examples of each are provided. But, even if they were not defined, these terms are well known and understood in the art.

"To fulfill the written description requirement, the patent specification must describe an invention in sufficient detail that one skilled in the art can clearly conclude that the inventor invented what is claimed." *Kao Corp. v. Unilever United States Inc.*, 441 F.3d 963, 967-68 (Fed. Cir. 2006). In this case, appellants left nothing to doubt. In the specification, they describe their invention using the terminology of claim 1 and then, using reaction schemes, illustrate and describe their invention in detail:

For purposes of illustration, acylating reactions involving dibenzyl dicarbonate, diallyl dicarbonate, acetic anhydride, chloroacetic anhydride and phenyl isocyanate are illustrated in Reaction Schemes 1 through 5 below. In this series of reaction schemes, the taxane which is selectively acylated at the C(10) position is **10-deacetylbaccatin III**. It should be understood, however, that these reaction schemes are merely illustrative and that **other taxanes having a C(10) hydroxy group, in general, and other 7,10-dihydroxytaxanes, in particular**, may be selectively acylated with these and other acylating agents in accordance with the present invention.<sup>6</sup>

Notably, Reaction Schemes 1-5 illustrate the selective acylation of 10-DAB using a variety of acylating agents, with and without a Lewis acid. Examples 1A-D, 9, and 10 are actual working examples, demonstrating that appellants were, in fact, in possession of the invention claimed.

<sup>5</sup> Office action mailed March 6, 2006, at pages 2-3, emphasis in original.

<sup>6</sup> Appellants' specification at page 8-9, emphasis added.

Absent from appellants' specification is any discussion which would lead a person of ordinary skill to conclude that appellants' invention was somehow limited by the range of substituents at positions other than C(7) and C(10). To the contrary, the thrust of appellants' invention was to reverse the order of reactivity of the hydroxy groups at the C(7) and C(10) positions (without regard to the substitution at other positions).

Against this backdrop, the Office has failed to provide any basis for asserting that the purported indefiniteness of hydrocarbyl, substituted hydrocarbyl, heteroaryl, and protecting group, terms which do not even appear in claim 1, would somehow lead a person of ordinary skill to conclude that appellants were not in possession of the invention defined by claim 1. Noticeably absent from the record is any evidence that supports the rejection.

In conclusion, therefore, the Office has failed to establish a prima facie case that the Group I claims are unpatentable for failure to satisfy the written description requirement of 35 USC 112, first paragraph.

#### **B. The Group II Claims (claims 3, 8, and 10)**

Claim 3 is representative of the Group II claims. It requires that the "taxane reacted with the acylating agent is 10-deacetyl baccatin III."

It is indisputable that the specification describes the selective acylation of 10-DAB. See, for example, reaction schemes 1-5 at pages 9-10, and Examples 1A-1D, 9, and 10.

Furthermore, the Office's concern with respect to the terms "hydrocarbyl, substituted hydrocarbyl, heteroaryl, and protecting group," is inapplicable. 10-DAB has a defined set of substituents and alternative "hydrocarbyl, substituted hydrocarbyl, heteroaryl, or protecting group" substituents is not permitted by claim 3 or the other Group II claims.



**C. The Group III Claims (claims 4, 5, 11, 12, 20 and 21)**

Claim 4 is representative of the Group III claims. It depends from claim 1 and requires that the taxane of claim 1 correspond to the structure of claim 4 wherein a range of substituents for the taxane are defined. As defined, certain of these substituents may be "hydrocarbyl, substituted hydrocarbyl, heteroaryl, or a protecting group."

As discussed in connection with the Group I claims, the terms "hydrocarbyl, substituted hydrocarbyl, heteroaryl, and hydroxy protecting group are defined in the specification.<sup>7</sup> But, even if they were not defined, these terms are well known and understood in the art and a written description is presumed to be adequate. M.P.E.P. § 2163.04. "Patent documents are written for persons familiar with the relevant field; the patentee is not required to include in the specification information readily understood by practitioners, lest every patent be required to be written as a comprehensive tutorial and treatise for the generalist, instead of a concise statement for person in the field." *Verve LLC v. Crane Cams Inc.*, 65 USPQ2d 1051, 1053-54 (Fed. Cir. 2002). A person of ordinary skill in the art of advanced organic synthesis knows what is encompassed by the terms and extended definitions of the terms and how to use them would unnecessarily convert the application into a treatise. Further, "[t]he Examiner has the initial burden of presenting by a preponderance of evidence why a person skilled in the art would not recognize in an appellants' disclosure a description of the invention defined by the claims." M.P.E.P. § 2163.04 (citing *In re Wertheim*, 541 F.2d 257, 263 (CCPA 1976)).

**1. Hydrocarbyl**

The term "hydrocarbyl" is well known in the art. Hydrocarbyl is defined in the IUPAC Compendium of Chemical Terminology 2nd Ed. (1997) as "univalent groups formed by removing a hydrogen atom from a hydrocarbon, e.g. ethyl, phenyl." Further, as of January 9, 2007 the term hydrocarbyl appears in more than twenty thousand patents. The Examiner failed to present any evidence as to why a person skilled in the

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<sup>7</sup> The definition of hydrocarbyl can be found at page 35, the definition of substituted hydrocarbyl can be found at pages 36-37, the definition of heteroaryl can be found at page 36 and the definition of protective group can be found at pages 34-35 of appellants' specification. Examples of each are provided.

art would not understand the term hydrocarbyl within the context of the invention or would doubt appellants' possession of this invention.

## **2. Substituted Hydrocarbyl**

The term substituted hydrocarbyl is also well understood by persons of ordinary skill. The possibility that a hydrogen atom could be substituted by another atom, carbon or hetero, is the foundation of organic chemistry. The Examiner failed to present any evidence as to why a person skilled in the art would not understand the term substituted hydrocarbyl within the context of the invention or would doubt appellants' possession of this invention.

## **3. Heteroaryl**

The term "heteroaryl" is known in the art. Heteroaryl is defined in the IUPAC Compendium of Chemical Terminology 2nd Ed. (1997) as "the class of heterocyclyl groups derived from heteroarenes by removal of a hydrogen atom from any ring atom; an alternative term is hetaryl." Further, as of January 9, 2007 the term hydrocarbyl appears in more than nineteen thousand patents. The Examiner has failed to present any evidence as to why a person skilled in the art would not understand the term hydrocarbyl within the context of the invention or would doubt appellants' possession of this invention.

## **4. Protective Group**

The term "protective group" appears in the claims in three forms: hydroxy protecting group, sulfhydryl protecting group, and amino protecting group.<sup>8</sup> All three classes of protective groups are well known in the art. The book "Protective Groups in Organic Synthesis," 2nd Ed. (1991) by T.W. Greene, contains a complete chapter on each type of protective group identified in the claims (Chapter 2 details hydroxy protective groups, Chapter 6 details thiol protective groups, and Chapter 7 details amino protective groups). This book is identified in the specification as a source of more

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<sup>8</sup> See Claim 4 in the Claims Appendix IX

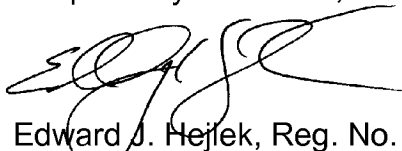
information regarding protecting groups.<sup>9</sup> The availability of this book in 1991 shows a person of ordinary skill in the field of organic synthesis in 1998 was readily aware of these protective groups and how to use them. Adding a long description of these protective groups would be considerably more than a "concise statement for persons in the field." Further, hydroxy protecting group is also defined in the definition section of the specification.<sup>10</sup> The Examiner failed to present any evidence as to why a person skilled in the art would not understand the terms hydroxy protecting group, sulfhydryl protecting group, and amino protecting group in the context of the invention or would doubt appellants' possession of this invention.

The terms hydroxy protecting group, sulfhydryl protecting group, amino protecting group, heteroaryl, and hydrocarbyl are known to people of skill in the art of organic synthesis in 1998; therefore, the specification need not contain a comprehensive tutorial on these terms. Therefore, the second set of claims should be allowed.

## VII. CONCLUSION

In view of the description and examples appearing in the specification of the patent application, a person of ordinary skill would conclude Appellants were in possession of the invention defined by each of the rejected claims. The terms the Examiner finds unsupported do not even appear in the Group I claims, are excluded by the Group II claims, and are defined in the specification and well understood, in any event. For these reasons and for those more fully stated above, Appellant respectfully requests the rejections be reversed and claims 1 and 3-23 be allowed.

Respectfully submitted,



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<sup>9</sup> Appellants' specification at page 35.

<sup>10</sup> Appellants' specification at pages 34-35.

## IX. CLAIMS APPENDIX

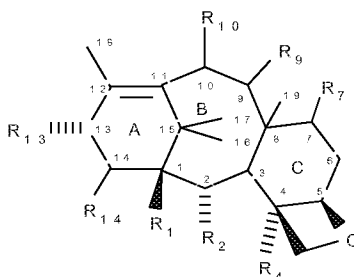
What is claimed is:

1. A process for the acylation of a C(10) hydroxy group of a taxane having C(7) and C(10) hydroxy groups, the process comprising treating the taxane with an acylating agent in a reaction mixture containing a Lewis acid and less than one equivalent of an amine base for each equivalent of taxane to selectively acylate the C(10) hydroxy group.

2. (cancelled)

3. The process of claim 1 wherein the taxane reacted with the acylating agent is 10-deacetyl baccatin III.

4. The process of claim 1 wherein the taxane has the structure:



wherein

R<sub>1</sub> is hydrogen, hydroxy, protected hydroxy, or together with R<sub>14</sub> or R<sub>2</sub> forms a carbonate;

R<sub>2</sub> is keto, -OT<sub>2</sub>, acyloxy, or together with R<sub>1</sub> forms a carbonate;

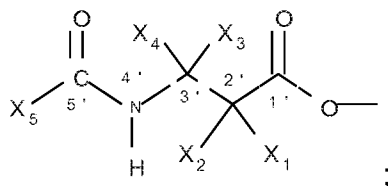
R<sub>4</sub> is -OT<sub>4</sub> or acyloxy;

R<sub>7</sub> is hydroxy;

R<sub>9</sub> is hydrogen, keto, -OT<sub>9</sub>, -OCOZ<sub>9</sub>, or -OCOOZ<sub>9</sub>;

R<sub>10</sub> is hydroxy;

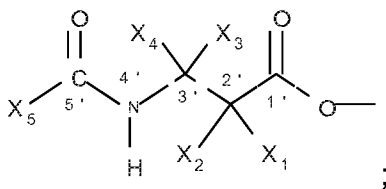
R<sub>13</sub> is hydroxy, protected hydroxy, keto, or



- $R_{14}$  is hydrogen,  $-OT_{14}$ , acyloxy, or together with  $R_1$  forms a carbonate;  
 $T_2$ ,  $T_4$ ,  $T_7$ ,  $T_9$  and  $T_{14}$  are independently hydrogen or hydroxy protecting group;  
 $X_1$  is  $-OX_6$ ,  $-SX_7$ , or  $-NX_8X_9$ ;  
 $X_2$  is hydrogen, hydrocarbyl, substituted hydrocarbyl, or heteroaryl;  
 $X_3$  and  $X_4$  are independently hydrogen, hydrocarbyl, substituted hydrocarbyl, or heteroaryl;  
 $X_5$  is  $-X_{10}$ ,  $-OX_{10}$ ,  $-SX_{10}$ ,  $-NX_8X_{10}$ , or  $-SO_2X_{11}$ ;  
 $X_6$  is hydrocarbyl, substituted hydrocarbyl, heteroaryl, hydroxy protecting group or a functional group which increases the water solubility of the taxane derivative;  
 $X_7$  is hydrocarbyl, substituted hydrocarbyl, heteroaryl, or sulfhydryl protecting group;  
 $X_8$  is hydrogen, hydrocarbyl, or substituted hydrocarbyl;  
 $X_9$  is an amino protecting group;  
 $X_{10}$  is hydrocarbyl, substituted hydrocarbyl, or heteroaryl;  
 $X_{11}$  is hydrocarbyl, substituted hydrocarbyl, heteroaryl,  $-OX_{10}$ , or  $-NX_8X_{14}$ ;  
 $X_{14}$  is hydrogen, hydrocarbyl, substituted hydrocarbyl, or heteroaryl; and  
 $Z_9$  is hydrogen, hydrocarbyl, substituted hydrocarbyl, or heteroaryl.

5. The process of claim 4 wherein

- $R_1$  is hydroxy or together with  $R_{14}$  or  $R_2$  forms a carbonate;  
 $R_2$  is  $-OCOZ_2$ ,  $-OCOOZ_2$ , or together with  $R_1$  forms a carbonate;  
 $R_4$  is  $-OCOZ_4$ ;  
 $R_9$  is hydrogen or keto;  
 $R_{13}$  is hydroxy, protected hydroxy, or



R<sub>14</sub> is hydrogen, hydroxy, protected hydroxy, or together with R<sub>1</sub> forms a carbonate;

$X_1$  is  $-OX_6$  or  $-NX_8X_9$ ;

X<sub>2</sub> is hydrogen, hydrocarbyl, or substituted hydrocarbyl;

X<sub>3</sub> and X<sub>4</sub> are independently hydrogen, hydrocarbyl, substituted hydrocarbyl, or heteroaryl;

$X_5$  is  $-X_{10}$ ,  $-OX_{10}$ , or  $-NX_8X_{10}$ ;

X<sub>6</sub> is a hydroxy protecting group;

X<sub>8</sub> is hydrogen, hydrocarbyl, or substituted hydrocarbyl;

X<sub>9</sub> is an amino protecting group;

X<sub>10</sub> is hydrocarbyl, substituted hydrocarbyl, or heteroaryl; and

Z<sub>2</sub> and Z<sub>4</sub> are independently hydrocarbonyl, substituted hydrocarbonyl, or heteroaryl.

6. The process of claim 1 wherein the acylating agent is selected from the group consisting of anhydrides, dicarbonates, thiodicarbonates, and isocyanates.

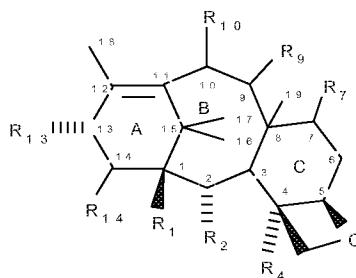
7. The process of claim 6 wherein the reaction mixture contains a Lewis acid selected from the group consisting of the halides or triflates of the Group IB, IIB, IIIB, IVB, VB, VIIB, VIII, IIIA, IVA, lanthanide, and actinide elements.

8. The process of claim 7 wherein the taxane reacted with the acylating agent is 10-deacetyl baccatin III.

9. The process of claim 6 wherein the reaction mixture contains a Lewis acid selected from the group consisting of zinc chloride, stannic chloride, cerium trichloride, cuprous chloride, lanthanum trichloride, dysprosium trichloride, and ytterbium trichloride.

10. The process of claim 9 wherein the taxane reacted with the acylating agent is 10-deacetyl baccatin III.

11. The process of claim 13 wherein the taxane has the structure:



wherein

R<sub>1</sub> is hydrogen, hydroxy, protected hydroxy, or together with R<sub>14</sub> or R<sub>2</sub> forms a carbonate;

R<sub>2</sub> is keto, -OT<sub>2</sub>, acyloxy, or together with R<sub>1</sub> forms a carbonate;

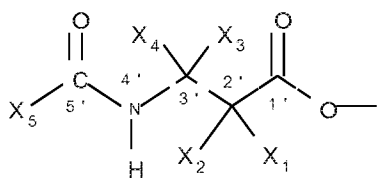
R<sub>4</sub> is -OT<sub>4</sub> or acyloxy;

R<sub>7</sub> is hydroxy;

R<sub>9</sub> is hydrogen, keto, -OT<sub>9</sub>, -OCOZ<sub>9</sub>, or -OCOOZ<sub>9</sub>;

R<sub>10</sub> is hydroxy;

R<sub>13</sub> is hydroxy, protected hydroxy, keto, or



R<sub>14</sub> is hydrogen, -OT<sub>14</sub>, acyloxy, or together with R<sub>1</sub> forms a carbonate;

T<sub>2</sub>, T<sub>4</sub>, T<sub>7</sub>, T<sub>9</sub> and T<sub>14</sub> are independently hydrogen or hydroxy protecting group;

X<sub>1</sub> is -OX<sub>6</sub>, -SX<sub>7</sub>, or -NX<sub>8</sub>X<sub>9</sub>;

X<sub>2</sub> is hydrogen, hydrocarbyl, substituted hydrocarbyl, or heteroaryl;

X<sub>3</sub> and X<sub>4</sub> are independently hydrogen, hydrocarbyl, substituted hydrocarbyl, or heteroaryl;

$X_5$  is  $-X_{10}$ ,  $-OX_{10}$ ,  $-SX_{10}$ ,  $-NX_8X_{10}$ , or  $-SO_2X_{11}$ ;

$X_6$  is hydrocarbyl, substituted hydrocarbyl, heteroaryl, hydroxy protecting group or a functional group which increases the water solubility of the taxane derivative;

$X_7$  is hydrocarbyl, substituted hydrocarbyl, heteroaryl, or sulfhydryl protecting group;

$X_8$  is hydrogen, hydrocarbyl, or substituted hydrocarbyl;

$X_9$  is an amino protecting group;

$X_{10}$  is hydrocarbyl, substituted hydrocarbyl, or heteroaryl;

$X_{11}$  is hydrocarbyl, substituted hydrocarbyl, heteroaryl,  $-OX_{10}$ , or  $-NX_8X_{14}$ ;

$X_{14}$  is hydrogen, hydrocarbyl, substituted hydrocarbyl, or heteroaryl; and

$Z_9$  is hydrogen, hydrocarbyl, substituted hydrocarbyl, or heteroaryl.

12. The process of claim 11 wherein

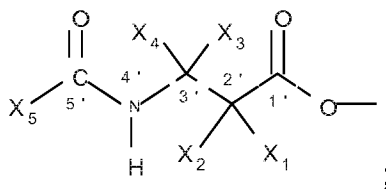
$R_1$  is hydroxy or together with  $R_{14}$  or  $R_2$  forms a carbonate;

$R_2$  is  $-OCOZ_2$ ,  $-OCOOZ_2$ , or together with  $R_1$  forms a carbonate;

$R_4$  is  $-OCOZ_4$ ;

$R_9$  is hydrogen or keto;

$R_{13}$  is hydroxy, protected hydroxy, or



$R_{14}$  is hydrogen, hydroxy, protected hydroxy, or together with  $R_1$  forms a carbonate;

$X_1$  is  $-OX_6$  or  $-NX_8X_9$ ;

$X_2$  is hydrogen, hydrocarbyl, or substituted hydrocarbyl;

$X_3$  and  $X_4$  are independently hydrogen, hydrocarbyl, substituted hydrocarbyl, or heteroaryl;

$X_5$  is  $-X_{10}$ ,  $-OX_{10}$ , or  $-NX_8X_{10}$ ;



X<sub>6</sub> is a hydroxy protecting group;

X<sub>8</sub> is hydrogen, hydrocarbyl, or substituted hydrocarbyl;

X<sub>9</sub> is an amino protecting group;

X<sub>10</sub> is hydrocarbyl, substituted hydrocarbyl, or heteroaryl; and

Z<sub>2</sub> and Z<sub>4</sub> are independently hydrocarbyl, substituted hydrocarbyl, or heteroaryl.

13. The process of claim 1 wherein the Lewis acid is selected from the group consisting of the halides or triflates of the Group IB, IIB, IIIB, IVB, VB, VIIB, VIII, IIIA, IVA, lanthanide, and actinide elements.

14. The process of claim 13 wherein the Lewis acid is selected from the group consisting of zinc chloride, stannic chloride, cerium trichloride, cuprous chloride, lanthanum trichloride, dysprosium trichloride, and ytterbium trichloride.

15. The process of claim 1 wherein the C(10) acylated taxane comprises a C(7) hydroxy group and the process additionally comprises treating the C(10) acylated taxane with a silylating agent to silylate the C(7) hydroxy group.

16. The process of claim 15 wherein the C(10) acylated taxane is baccatin III.

17. The process of claim 1 wherein the C(10) acylated taxane comprises a C(7) hydroxy group and the process additionally comprises treating the C(10) acylated taxane with an acylating agent to acylate the C(7) hydroxy group.

18. The process of claim 17 wherein the C(10) acylated taxane is baccatin III.

19. The process of claim 1 wherein the C(10) acylated taxane comprises a C(13) hydroxy, metallic oxide, or ammonium oxide substituent and the process additionally comprises the step of esterifying the C(10) acylated taxane by treating the C(10) acylated taxane with a side chain precursor selected from the group consisting of  $\beta$ -

lactams, oxazolines, oxazolidine carboxylic acids, oxazolidine carboxylic acid anhydrides, and isoserine derivatives.

20. The process of claim 5 wherein the acylating agent is selected from the group consisting of anhydrides, dicarbonates, thiodicarbonates, and isocyanates; and the Lewis acid is selected from the group consisting of the halides or triflates of the Group IB, IIB, IIIB, IVB, VB, VIIB, VIII, IIIA, IVA, lanthanide, and actinide elements.

21. The process of claim 12 wherein the acylating agent is selected from the group consisting of anhydrides, dicarbonates, thiodicarbonates, and isocyanates.

22. The process of claim 14 wherein the acylating agent is selected from the group consisting of anhydrides, dicarbonates, thiodicarbonates, and isocyanates.

23. The process of claim 16 wherein the acylating agent is selected from the group consisting of anhydrides, dicarbonates, thiodicarbonates, and isocyanates; and the Lewis acid is selected from the group consisting of the halides or triflates of the Group IB, IIB, IIIB, IVB, VB, VIIB, VIII, IIIA, IVA, lanthanide, and actinide elements.

X. **EVIDENCE APPENDIX**

None.

**XI. RELATED PROCEEDINGS APPENDIX**

None.